

ATOMIC ENERGY

ROBERT M. SHERMAN, EDITOR. PUBLISHED BIWEEKLY BY ATOMIC ENERGY NEWS, INC., 509 FIFTH AVENUE, NEW YORK 17, N.Y.

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Dear Sir:

Atomic energy projects of the U. S. Army, Navy, and Air Force were included in an act authorizing \$596 million, for these services, which was signed last week by President Truman. (The act, S. 2440, is in addition to fiscal 1951 funds for the civilian U.S. Atomic Energy Commission, now under Congressional consideration.) This new legislation authorized nearly \$3 million for the Army Chemical Center, Maryland, for a process laboratory, radiological "hot" and "cold" laboratories, and other facilities. The Armed Forces Special (atomic) Weapons Project, with activity centering about Sandia Base, New Mexico, was allocated approximately \$12½ millions. Eight million dollars were authorized for the anti-aircraft and other defensive Army units at Hanford Plutonium Works (See page 2, this LETTER). At the Navy shipyard, San Francisco, \$1 million was authorized for a radiological laboratory. Other Naval atomic projects were included in a grant given the Navy of \$23 million for certain construction work.

Participation by private industry in nuclear power development was suggested in a plan advanced last week by Dr. Charles Allen Thomas, of Monsanto Chemical Co. He suggested that a private syndicate, or a pair of industries, might share costs of design, construction and operation of a nuclear reactor. The uranium for the reactor would be loaned by the Government, and the radioisotopes and fissionable by-products from its operation would belong to the Government. The heat from the reactor would be converted to usable power, under Dr. Thomas's plan, and this would be one income source for the operators of the reactor. They would also get a fee from the government for producing plutonium (which in this case would be incidental to the production of heat). Dr. Thomas estimated that the plutonium produced under such an arrangement would cost less than that now produced at Hanford Works.

Commercial application of a 2-million electron-volt accelerator has now been reported by the Upjohn Pharmaceutical Co., Kalamazoo, Mich. The company said it had used the accelerator to sterilize such antibiotics as penicillin, and streptomycin. The method may replace the heat, filtration, and chemical treatment previously used for this purpose...Use of a cyclotron for processing and preserving foods was described last week in Chicago by Nathan Cummings, chairman, Consolidated Grocers Corporation. Cummings said that "phenomenal" keeping qualities are imparted to foods after they are subjected to such electron bombardment. He said that the work was in an advanced stage; that samples of such foods had been turned out in a pilot plant.

A symposium on atomic energy in war and peace will be part of the American Medical Association meeting in San Francisco, June 26-30. In this symposium, Everett Evans, Professor of Surgery, Medical College of Virginia, will discuss the burn problem in war, while Eugene Cronkite, Naval Medical Research Institute, will discuss diagnosis and treatment of radiation injuries.

AT THE ATOMIC CITIES & CENTERS IN THE UNITED STATES...

ARCO, Idaho- Under a recently awarded contract, Foster-Wheeler Corporation, New York, will do architect-engineering services for the design of the chemical separation plant at the nuclear reactor testing station here. Thirty-seven firms were considered before this contract was awarded Foster-Wheeler. The plant, to cost approximately \$8 million, will provide a means of separating fissionable materials from accompanying fission products, after use in the nuclear reactors here, and make the material available for re-use. The scope of Foster-Wheeler's work will embrace design and inspection of construction of all architectural and structural features of the plant and its associated facilities. In addition, the firm will be available to assist Oak Ridge National Laboratory in designing the chemical process to be used in the plant. It is expected that the design of the plant should be completed the latter part of this year.

With the increased emphasis on the U. S.'s nuclear reactor program, the construction schedule here has been considerably increased during the past five or six months. On the two main building projects now underway--buildings for the materials testing reactor, and the experimental breeder reactor--the steelwork has just been erected on the experimental breeder, and excavation is underway for the materials testing reactor. Before the end of this year, the AEC will advertise for an additional \$11 million worth of work to be done here. It is expected that ground will be broken in September for the third reactor--the land based prototype of a naval reactor. Preliminary site work is now being done on this project.

RICHLAND, Washington- The gradually increasing tempo of construction activity, on the multi-million dollar expansion of Hanford Plutonium Works here (AEN 1/3/50, p.2), will see approximately 5,700 construction workers on the various projects by this July 1st. A peak of about 6,000 is expected to be reached late this summer, and again early in the Spring of 1951. When the expansion is complete, Hanford's permanent operating staff is expected to increase by 5-10%; present operating force is 8,000. Completion of the construction program will see North Richland, the camp for building trades workers at Hanford, turned into an Army post; some 800-odd anti-aircraft troops are there now, and will be reinforced by others in the permanent program (page 1, this LETTER).

ARGONNE NATIONAL LABORATORY, Chicago- The new research reactor (CP-5) for Argonne is scheduled for construction within the next few months. Estimated to cost \$2,175,000.00, it will be an enriched uranium, heavy-water cooled and moderated reactor. This reactor, first planning on which was done in 1949, will be based on an entirely new design, and will replace the present nuclear reactor here (CP-3) which is also a heavy water-cooled and moderated reactor. The CP-3 reactor, which was built with a life expectancy of 1 year, and has been operating for 4 years, now requires considerable ingenuity to keep it in safe operating condition. It is also somewhat primitive in design by today's standards. It is felt that the new and more versatile reactor will permit an accelerated program of development work in connection with reactors, and in the basic physical sciences.

Designed specifically for exploring applications of radioisotopes for treatment of cancers in humans, the \$3½ million Argonne Cancer Research Hospital will have first construction steps underway this month. Specialized laboratories for processing radioisotopes; a betatron for treatment; and other laboratories and electronic and radiology shops will make up some of its facilities. Research programs of the hospital, which will be located on the University of Chicago campus, will be participated in by Argonne staff members, as well as staff from the thirty-one research institutions associated with Argonne. The close proximity of the hospital to Argonne will be an especial advantage, since it will make feasible transportation, with minimum loss of energy, of radicisotopes of short half-life from Argonne's nuclear reactor to the hospital.

NEW PRODUCTS, PROCESSES & INSTRUMENTS...for nuclear work...

INSTRUMENT BUYING by the U.S. Government- Under bid invitation no. 594, the Chemical Corps Procurement Agency, Army Chemical Center, Md., has asked for bids to supply 6 beta, gamma sample monitors. Also, under bid invitation no. 596, this agency will buy various laboratory equipment for radioisotope work. Closing date for receipt of both these bids is June 23rd.

FROM THE MANUFACTURERS- New portable lead shield for carrying or storing radioisotopes in standard 30 cc vaccine or glass-stoppered bottles. The shield, model no. 805, has aluminum inner and outer shells, and provides a minimum lead wall thickness of 1" in all directions. The inner chamber measures $1\frac{1}{8}$ " x 4"--sufficiently large to permit handling of other types of radioactive materials. Carrying handle is cast as integral part of top cover.-- Atomic Instrument Co., 160 Charles St., Boston, Mass.

New alpha scintillation probe for use with commercially available scalers and count rate meters for the selective detection and measurement of alpha particles. The phosphor light pulse generated by alpha bombardment has a decay time of about 10 microseconds, making it possible to count at the maximum rate of most scalers. Background of about five counts per hour, manufacturer states, so that maximum statistical accuracy can be achieved and weak alpha samples can be measured. Said to be almost completely insensitive to beta or gamma radiation, but practically 100% efficient for alpha particles with energies of four to five Mev.--Tracerlab, Inc., 130 High St., Boston,

INDUSTRIAL APPLICATIONS- Cobalt-60 for weldment inspection will be explained by W. Schwinn, Babcock & Wilcox Co., to the American Society for Testing Materials, at the Society's annual meeting, June 26-30, at Atlantic City. Schwinn's paper, concerned with the industrial applications of cobalt-60, compares radiographs taken with this source, with those taken with x-rays and gamma-rays. Radiographs which have been exposed with variable x-ray voltage in the range 250-200 kv are studied and compared to similar exposures with cobalt-60 and gamma-rays in the range of plate thicknesses of 1- to 4-in. To demonstrate the relative sensitivity of these sources, and also the techniques required, the economics, exposure times, and sensitivity charts covering these results will also be presented. (This paper will be one of those in a symposium to acquaint engineers and management with the advantages and uses of non-destructive testing.)

ATOMIC PATENT DIGEST...latest U.S. & British applications & grants...

Vacuum tube fluxmeter. A method of measuring the strength of a magnetic field of a magnet. A triode, in which is established a predetermined current, is inserted into the magnetic field between the poles of the magnet. The direction of the electrostatic field of the triode is normal to the direction of the magnetic field. U.S. Pat. No. 2,509,394, issued May 30, 1950; assigned to the United States of America (USAEC).

Mechanical coupling. A joint comprising two abutting members with semi-circular grooves in the abutting ends, which provide an annular groove having a cylindrical outer wall and a frusto-conical inner wall. An annular coupling member is seated in and fits the annular groove. U.S. Pat. No. 2,509,669, issued May 30, 1950; assigned to United States of America (USAEC).

Apparatus for measuring radioactive contamination on the human hand. Comprises two radiation counters, mounted parallel and facing each other and separated by a distance approximating the thickness of a human hand. One counter is mounted pivotally so that the space between the counters assumes the contour of a hand when it is inserted. U.S. Pat. No. 2,509,700, issued May 30, 1950; assigned to United States of America (USAEC).

Device for logging boreholes. Comprises a housing adapted to be lowered and raised through the borehole, a source of neutrons, and a detector of neutrons in the housing. The detector is responsive to neutrons from the source scattered in the formation. U.S. Pat. No. 2,509,908, issued May 30, 1950; assigned to the Texas Company, New York.

RAW MATERIALS...radioactive ores & other essentials for nuclear work...

UNITED STATES- Uranium and thorium occurrences in the U. S., and their importance in atomic energy work, were outlined recently before the American Institute of Mining and Metallurgical Engineers, in Los Angeles, by Dr. R. J. Wright, AEC geologist. Thorium (said Dr. Wright) chiefly has interest for its long-range potential use as a source of fissionable material. In California, a study of the monazite reserves in placers there is now being made by the U. S. Bureau of Mines, for the AEC.

As to uranium (Dr. Wright continued), the Colorado Plateau carnotites are the largest proved domestic source of this element. To encourage development of deposits there by private capital, the U. S. Geological Survey is currently engaged in a diamond drilling exploration program. The drilling is of the incentive type, i.e., an effort is made to outline favorable areas for more detailed exploration by private capital. Two finds in this area are of interest. One was in the old Caribou mine in the Colorado Front Range. Tailings had shown radioactivity, and in 1948 the workings in this formerly abandoned mine were rehabilitated. A radiometric reconnaissance of the 1040-foot level indicated abnormally high radioactivity, and pitchblende was found in a silver-lead-zinc vein. Underground exploration is now in progress at this mine (Consolidated Caribou, as it is now known). The other find, made in the Coeur d'Alene district of Idaho, was similar. A Geiger counter reconnaissance of the lower workings of the Sunshine mine there showed radioactivity, and pitchblende-bearing veinlets were located.

Dr. Wright pointed out that the disc series of uranium in these two mines (above) indicate that pitchblende may be present in ore deposits which have not previously been known to carry radioactive minerals. He said the AEC expects further finds of this type will be made. It is not surprising (Dr. Wright stated), that uranium minerals may remain unrecognized during years of mining operations. This, he said, is because in most cases the pitchblende forms only a small portion of the ore, and is not usually distinctive in hand specimens.

INDIA- The Government of India will now grant rewards for the discovery in India of deposits of uranium ore and beryl ore. In the case of uranium, the new deposits would have to be no less than 100 miles, and in the case of beryl, 50 miles, from any other deposits of these ores, the existence of which is already known to the Indian Atomic Energy Commission. The Government reserves the right to determine whether a particular discovery is the first from that location. An award of up to Rs. 10,000 may be given, if, in the opinion of the Government, the new deposit is capable of producing 100 tons of uranium oxide in ore. A similar discovery capable of producing 100 tons of beryl or other beryllium minerals in proportionate amounts may earn an award of Rs. 2,000.

PORtUGAL- Output of beryl, produced as a by-product of feldspar and quartz mining, is now officially reported at 15 to 20 metric tons, averaging 10 to 11% BeO, in 1949. Exports of beryl, for 1949, are reported to have gone to France.

BOOKS & OTHER PUBLICATIONS...in the nuclear field...

Uranium, Radium and Thorium, by Allan F. Matthews. Preprint from Minerals Yearbook of 1948, which is not yet available. 17 pages, 1 fig. --Superintendent of Documents, Washington 25, D.C. (10¢)

The Radiological Laboratory. Discusses hazards, special equipment, and data on the design and operation of a laboratory using radioisotopes. Prepared by and available from--College of Engineering, New York University, New York, N. Y. (10¢)

Standard Glossaries in Nuclear Science. A series of booklets reporting the National Research Council conference on nuclear science and technology. Section V contains the proposed American standards for terms used in chemical engineering. Section VI deals with biophysics and radiobiology.--American Society of Mechanical Engineers, 29 West 39th St., New York 18, N.Y. (60¢ ea.).

IONIZING RADIATION...investigations & notes...

A study has been made by J. Schubert and Marcia R. White, Argonne National Laboratory, Chicago, of the effect of different dose levels of zirconium on the excretion and distribution of plutonium and yttrium. Observations were made of adult rats which had been injected intraperitoneally with a citrate solution containing both Pu-239 and Y-91, in graded dose levels, and subsequently killed. It was found that the amount of Pu or Y excreted in the urine was proportional to the size of the dose of Zr. The reduction of skeletal content of Pu was nearly independent of the amount of Zr injected, but that of Y was increased with increased dosages of Zr. Liver retention of Pu was increased, then decreased, with increasing dosages of Zr, but the Y content of the liver was little affected. Three days after the injections, the blood level of the Pu in the Zr-treated rats was much lower than the control level.

The use of preparations of Euphorbia pilulifera for prevention of radiation poisoning has been investigated by L. J. Gelber, of New York. Gelber found that in tests of skin reaction to deep roentgen irradiation, in 31 subjects, results with a 1% solution of Euphorbia pilulifera were an improvement over those when no medication was used. Results with Rayderm ointment (containing Euphorbia pilulifera in a healing ointment) were still better as regards absence of skin reaction and increased tolerance to x-ray dosage, 2200 r in air causing less reaction than 1300 r without medication.

RADIOISOTOPES...as used for tracer & therapy applications...

An evaluation of the radioiodine test for thyroid function has been made by H. L. Jaffee, and R. E. Ottoman, of the Dep't. of Radiation Therapy, and the Thyroid Clinic, Cedars of Lebanon Hospital, Los Angeles. In the work, a study was made of radioiodine uptake by the thyroid gland in 152 persons suspected clinically of having some alteration in thyroid function. Among their conclusions were that the study of radioiodine uptake in man is a safe and accurate diagnostic test for hyperthyroidism. They also observed that the basal metabolism test and the protein-bound blood iodine determination are not routinely necessary unless the results of the radioiodine uptake study are borderline (30 to 35%) or out of proportion to the clinical picture. According to the study, the radioiodine tracer test is 95% accurate; the blood iodine test is 80% accurate; and the basal metabolism test is 67% accurate. The researchers advise radioactive uptake studies, when available, for all patients with clinically suspected hyperthyroidism, regardless of the type of treatment to be used.

To provide a basis for evaluating the effect of carrier gallium when the radioactive isotope of this element is used therapeutically, studies were made of stable gallium by H. C. Dudley, Katherine E. Henry, and B. F. Lindsley, of the Naval Medical Research Institute, Bethesda, Md. The effect of injected gallium tartrate on larger animals, and gallium citrate on mice, rats, rabbits, dogs, and goats was studied. Among the findings were that gallium tartrate is much more toxic on a mgm. Ga/Kgm. basis for larger animals than for the smaller species. Further, gallium citrate was found more suitable as a means of administering soluble gallium to experimental animals than gallium tartrate. It was also observed that gallium citrate is not absorbed from the gastrointestinal tract, and produced no significant effect when fed to rats for thirteen weeks.

Using human serum albumin tagged with radioactive iodine (I-131), a method has been evolved of determining plasma volume in man. In the work, by K. R. Crispell, Blanche Porter, and R. T. Nieset, of the Biophysical Laboratory, Tulane University, New Orleans, human serum albumin, iodinated with radioactive iodine (I-131), was used to determine the plasma volume. Volume determinations made simultaneously, using radio-albumin, and Evans Blue Dye, T-1824, gave comparable results. Repeated serial determinations, in the same patients, gave values which checked within a range of plus or minus 2 per cent.

Sincerely,

The Staff,
ATOMIC ENERGY NEWSLETTER